

# FIREWORKS FOR THE FOURTH

**T**HAT fireworks in general are hardly more than highly differentiated firecrackers might be said with almost literal truthfulness, inasmuch as practically all of the pyrotechnic toys employed for the purposes of celebration on the Fourth of July depend primarily upon the paper tube loaded with combustibles of one sort or another, as the fundamental element, so speak, in their construction.

Even the great "set pieces," which might be called fire pictures, and which are erected upon scaffolds sometimes as much as a hundred feet in length, depend for their effects wholly upon such paper cylinders, no bigger than good-sized firecrackers, stuck all over the lattice work of the skeleton structure employed by the fire-painter in lieu, as one might say, of canvas.

Something more in detail about these fire pictures will be said later on; but meanwhile it may be as well to speak descriptively of the processes used in the manufacture of the more simple and familiar kinds of fireworks—such, for example, as roman candles, bombs, rockets, pinwheels and the like. All of these, excepting the bombs, are substantially nothing more than cylinders of pasteboard, filled with combustibles and fashioned in different ways.

One of the greatest fireworks factories in the world is located on the outskirts of Brooklyn, but the stranger who passes by it on a trolley car on the way to Coney Island would scarce suspect the character of the outfit, which is scattered over about twenty acres of land in a series of small buildings, some of them being so tiny as to accommodate only a single workman. The object of this arrangement is to minimize the consequences of accidents. If the lone man who occupies any one of the tiny houses should happen to be blown up he alone would suffer.

It naturally happens that the only building of considerable size on the premises is one in which no explosives or other lively combustibles are used. Here, in fact, is where all the paper is stored, tons upon tons of it, for the outer wrappings of the fireworks. Pyrotechnic toys, of course, must be pretty to look at, else they would not sell to advantage and the papers utilized for the purpose are of all colors of the rainbow and a great variety of ornamental patterns. For extra fancy goods more or less gilt and silver paper is employed.

Upstairs in the same building all of the paper cylinders are made, the process adopted being so exceedingly expeditious that one person can turn out as many as 18 gross of them in a day. Of course they are of all lengths and diameters according to kind and size of fireworks for which they are intended and though the rocket cylinders are rolled by machine all of the others are made by hand. With the aid of a long, round stick of metal and a pot of paste the operator converts sheets of thin, brown pasteboard into neat and compact tubes at the rate of three or four a minute.

A dozen work people engaged in this occupation can turn out an immense number of cylinders in a day and the manner in which they are utilized in the manufacture of different kinds of fireworks will presently be explained. It might be well to say incidentally, however, that in this same department are made the bombshells, which are stamped by a machine out of paper-mache in halves. When they have become dry the halves are joined by strips of thin canvas soaked in paste, each sphere thus produced having a round hole at one end for loading.

Bombs are among the most interesting and beautiful of fireworks and some of them are of great size—as much as five feet in diameter. They are discharged from mortars and, reaching a height of 1,000 feet or more, explode with a great noise, liberating showers of many-colored stars or golden rain, or sometimes parachutes carrying trains of stars. Some are made as small as two inches in diameter—baby ones, suitable for family use.

The method of their construction is always the same and is at once simple and ingenious. The paper-mache shell is filled with "stars"—that is to say, with little pieces of cylindrical paper tubing packed with different chemical compositions. Beneath the shell thus loaded is attached and firmly glued a paper receptacle containing a slow-burning composition similar to gunpowder. Then a fuse is so fixed that being ignited at the instant of the bomb's discharge it will burn just long enough to explode the shell at the moment when the projectile has reached its greatest height in the air. When this happens the paper shell is blown to pieces and the stars, incidentally ignited, are thrown far and wide. Being light, they fall slowly and the effect produced is very beautiful.

Even the stars, you see, are paper cylinders, though only half an inch perhaps in length. But they vary much in size, according to the uses to which they are to be put. A man cuts them by the millions with a small circular saw, taking a handful of paper tubes of small diameter and using the saw to chop them into short pieces of equal length. Then the little sections are filled with chemical mixtures of various kinds, nitrate and chlorate of baryta being used for green, carbonate of strontium for red, oxylate of soda for yellow and (oddly enough) paris green for blue, with various admixtures of chlorate of potash, shellac, etc.

It should have been said that, in order to strengthen the paper-mache shells and so to enable them to scatter their stars more widely when shattered, they are wound with strong grocer's twine, outside of which the final decorative paper cover is put on. There is, however, another and quite new kind of bomb, which is made in the shape of a cylinder. It is so constructed that during its flight through the air it makes a series of "breaks," sometimes as many as ten, throwing out each time a shower of stars. This, as might be imagined, is a very beautiful effect, and is achieved by dividing the containing cylinder into a series of compartments holding stars, each compartment being set off in its turn.

Some of these cylindrical bombs contain parachutes, which are arranged like the parachutes dropped from rockets. Inside of the pasteboard case is a circular piece of tissue paper, around the circumference of which are attached a series of very long strings. To each of these strings are fastened at intervals a number of the little paper stars already described and the arrange-



MAKING PARACHUTES FOR ROCKETS AND BOMBS

ment is such that when the paper disk, which is the parachute, is thrown out of the receptacle it instantly expands and drifts slowly downward, while the ignited stars, dangling along the strings beneath, make an exceedingly pretty display.

The methods adopted in the case of parachute rockets is exactly the same, the parachute and its attachments being packed into the "head" of the rocket. A rocket, of course, consists of two parts, the lower portion being a pasteboard cylinder, made especially thick, containing the explosive that makes the thing go up, while the upper compartment is simply a receptacle to hold stars, parachute, golden rain stuff, or whatever is to be liberated when the projectile has reached its highest point in the air.

What is called a "mine" is a big cylinder of pasteboard, which may be four or five feet high and which is attached to a square wooden base, in order that it may be stood up. Inside of the cylinder is put a propelling charge of the slow explosive and on top of it a paper bag filled with stars. At the top is an ordinary roman candle, which serves as a sort of spout. When the roman candle is lighted it shoots a few fiery balls successively in the customary manner, and then, the explosive inside having been reached, the whole affair explodes, throwing a multitude of stars in all directions.

Comparatively new are the so-called "batteries" of roman candles, which, in proportion to the number of candles going off simultaneously, produce a brilliant display. "Gerbs" are cylinders filled with iron filings, which are thrown out in an incandescent state by the slow-burning explosive. They are intended to be tacked upon a fence or to some such place, at a height of six feet.

It is a fact worth mentioning incidentally that all of the marine night signals, which are carried on every vessel, are made by the fireworks concerns. The Brooklyn factory supplied those used on the yachts during the recent race across the Atlantic. They are made on the same principle as "bengola" lights, a familiar pyrotechnic toy, but with a wooden head. Such a contrivance is a pasteboard tube divided into compartments, usually three in number, containing inflammable compositions of different colors. Occasionally stars are added. Inasmuch as the colors—green, white and red—may be arranged in various ways, one can talk across the sea by the help of these lights on the darkest night.

In the tiny houses already described all the filling of roman candles is done. For this purpose machinery is used and it is always a possibility that a spark might ignite the gunpowder and composition, of which considerable quantities have to be kept immediately at hand. But these explosives and also the stars (which take the form of fiery balls as they are ejected from the candles) are stored in cubbyholes protected by swinging metal shutters. Each time the lone workman helps himself to stars or powder he is obliged to push aside the shutter, which falls again in place the instant that he has obtained what he wants. The cubbyholes open to the outside by windows, so that if there were an explosion the flame would be thrown outward from the building and not into it.

Thus safeguarded against mischance, the lone workman manipulates a machine by the help of which he loads two dozen roman candles at one time. Into them he puts gunpowder, composition and stars successively, layer after layer, ramming down each portion of the charge after the manner of loading an old-fashioned musket. Where candles that hold ten stars are being made the operation is somewhat complicated and hence the importance of doing as many as possible at once.

Most interesting of all, perhaps, is the making of the fire pictures, the construction of which begins with a latticework put together by a skilled carpenter. It is made as light as possible, and upon it is tacked the rattan which forms the outlines of the picture. Rattan is chosen for the purpose because it is pliable and can be bent into any sort of curves. The carpenter has before him a drawing, made by the artist of the company and executed to a certain scale. It is a simple matter to reproduce the lines of this drawing in rattan, so to speak, on an enlarged scale.

Having thus made the outlines of the picture in rattan upon a background of lattice work, the carpenter drives at short intervals along the rattan a series of little nails. Upon each nail is to be put a small cylinder, a quarter of an inch in diameter and three inches long, loaded with some colored fire composition. When this operation has been completed the artist comes along, and with his pencil marks upon the latticework the different colors, "red," "green," "blue," etc., that are to appear in flame in various parts of the design. In obedience to these indications the loaded cylinders, which may number thousands, are stuck upon the nails subsequently by skilled young women. Finally all of the cylinders are attached together by a "quick match," which is lampwick saturated with a mixture of gunpowder and starch and threaded through a thin paper tube. Thus when fire is set to the fuse it will run in a few seconds all over the lattice work and the fire picture will be presented to view in gorgeous colors.

## WOMAN FINDS A WAY.

Two burglars were on their trial and had engaged a smart lawyer for their defense, who, on cross-examining one of the witnesses, said: "You say that on the night in question the moon was so bright that you could see the burglars in the room. Was your husband awake at the time?"

"Witness—I don't know."  
"Was his face turned toward you or not?"  
The witness answered that she did not know.  
"What! You don't know? Now, come, tell me, was his face turned toward you or the wall?"  
"I don't know."

"Ah, ha! I thought so" (turning to the jury). "She could not see. She who identifies the prisoners could not see which way her husband's face was turned. Explain that if you can."  
"Well, sir, my husband is so bald that in a dim light I can't tell his face from the back of his head."—Tatler.

## THE MISTAKE OF A NIGHT.

He saw her sitting in the dark corner and knew that his chance had come. Noiselessly he stole up behind her and before she was aware of his presence he had kissed her. "How dare you?" she shrieked.  
"Pardon me," he bluffed, readily; "I thought you were my sister."  
She stepped out into the light. "You silly fool!" she giggled. "I am!"  
He fainted.—Cleveland Leader.

## CORN PLANTING IS OVER

THAT CANADIAN TRIP SHOULD NOW BE TAKEN.

If you had intended going to Canada for the purpose of purchasing land on which to establish a home and accompanying some land company, whose holdings you proposed to look over or to go up on your own account to select one hundred and sixty acres of land free, you should delay no longer. Corn-planting is over, your wheat crop is well ahead, and you have a few weeks' time before you are required in the fields again. Now make your intended trip. Reports at hand show that the crop prospects in Canada were never better than they are today. The cool weather has not affected the crop, but if anything, it has been a benefit. There has been plenty of moisture and those who have had their land properly prepared look upon this year as likely to be one of the best they have had. A great many are going up this season who expect to pay two or three dollars an acre more than they were asked to pay last year. Others who wish to homestead are prepared to go farther from the line of railway than would have been necessary last year. Still it is worth it. So it will be with you. Next year lands will be higher-priced and homesteads less accessible. There is a wonderful tide of immigration to Central Canada now. It is expected that one hundred and fifty thousand new settlers from the United States will be numbered by the end of the present year, an increase of fifty per cent over last year. In addition to this there will be upwards of one hundred thousand from the old country, which does not include those who may come from the northern countries of the Continent. These all intend to settle upon the land. The reader does not require an answer to the questions, "Why do they do it?" "Why are they going there in such large numbers?" Western Canada is no longer an experiment. The fact that one hundred and fifty million bushels of wheat were raised there last year as against ninety-five millions the year previous, shows that the tiller of the soil in Central Canada is making money and it is safe to say that he is making more money than can be made anywhere else on the Continent in the growing of grains. He gets good prices, he has a sure and a heavy crop, he enjoys splendid railway privileges, and he has also the advantages of schools and churches and such other social life as may be found anywhere. It is difficult to say what district is the best. Some are preferred to others because there are friends already established. The Grand Trunk Pacific, on its way across the Continent, is opening up a splendid tract of land, which is being taken up rapidly. The other railways—the Canadian Pacific and Canadian Northern are extending branch lines into parts inaccessible a couple of years ago. With a perfect network of railways covering a large area of the agricultural lands it is not difficult to secure a location. Any agent of the Canadian Government will be pleased to render you assistance by advice and suggestion, and a good plan is to write or call upon him. The Government has located these agents at convenient points throughout the States, and their offices are well equipped with a full supply of maps and literature.

## Valued Absences.

"Always speak kindly of the absent," said young Mr. Primly.  
"I would," replied Miss Cayenne, "if I thought it would be an inducement to some tiresome people to remain so."

## A Trained Nurse's Experiences with Resinol Ointment.

I applied Resinol to an ulcerated leg of six months' standing. Almost everything had been tried to heal it. Made two applications a day for four weeks and leg was permanently healed. I have used Resinol on children's faces to heal eruptions and for everything that seemed to need an ointment with satisfactory results in every case.

Mrs. Isadore E. Cameron,  
Augusta, Me. (Graduated Nurse.)

## Horrible Thought.

"But why do you think we are in imminent danger of a war with England?"  
"Ain't Alfred Austin just as likely as not to write a poem on the occasion of Roosevelt's visit?"

## A Woman's Advice.

A woman was looking over the shoulder of a man who was writing this item, and just when he got to this point, and was writing the word "soap," she said: "There's one great essential in a laundry soap. It must be a soap that will not rot the clothes or the fabrics. Some soaps will clean goods, but they rot them; others have sticky, yellow rosin in them and stain the clothes yellow. Just you write that Easy Task soap saves half the work and saves all the clothes and drives away the dirt and keeps away the disease germs, and is the best soap I ever found." And so her advice has been followed, for women know soap.

Give a man health and a course to steer, and he'll never stop to trouble about whether he's happy or not.—G. Bernard Shaw.

Red, Weak, Watery Eyes, Relieved by Murine Eye Remedy. Try Murine For Your Eye Troubles. You Will Like Murine. It Soothes. 50c at Your Druggists. Write For Eye Books. Free. Murine Eye Remedy Co., Chicago.

Men who remain neutral in times of public danger are enemies to their country.—Addison.



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"As an American I am delighted to see the remarkable progress of Western Canada. Our people are flocking across the boundary in thousands, and I have not yet met one who admitted he had made a mistake. They are all doing well. There is a great community in the Middle or Western States that has not a representative in Manitoba, Saskatchewan or Alberta."

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For pamphlet, "Last Best West," particulars as to suitable location and low settlers' rates, apply to Sup't of Immigration, Ottawa, Can., or to Canadian Gov't Agent, H. M. WILLIAMS, Law Building, Toledo, Ohio (Use address nearest you.) (1)

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